

Claims

1. An antenna for use in a mobile communication device, comprising:
5 an antenna substrate with a front side and a back side;
a first spiral conductor located on the front side of the antenna substrate;
and
a second spiral conductor located on the back side of the antenna substrate,
wherein the first spiral conductor and the second spiral conductor are
10 electrically connected.
2. The antenna of claim 1, wherein the first spiral conductor and the second spiral conductor are electrically connected through a hole in the antenna substrate.
- 15 3. The antenna of claim 1, wherein the first spiral conductor is connected to a feeding port used to form an electrical connection between the antenna and a mobile communication device.
4. The antenna of claim 1, wherein the first spiral conductor and second spiral conductor have the same shape.
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5. A housing for use with a mobile communication device containing the antenna of claim 1.
- 25 6. An antenna for use in a mobile communication device, comprising:
an antenna substrate with a base, a top, a front side and a back side;
a first conductor located on the front side of the antenna substrate, said first conductor comprising a dual branched antenna with a space-filling or grid dimension branch and a linear branch; and
30 a second conductor located on the second side of the antenna substrate, said second conductor comprising a conducting plate.

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7. The antenna of claim 6, wherein the first conductor and the second conductor are electrically connected.
- 5 8. The antenna of claim 7, wherein the first conductor and the second conductor are electrically connected through one or more holes cut in the antenna substrate.
9. The antenna of claim 6, wherein the first conductor is connected to a
10 feeding port used to form an electrical connection between the antenna and a mobile communication device.
10. The antenna of claim 6, wherein the space-filling or grid dimension branch of the first conductor receives frequencies in the GSM900 band.
- 15 11. The antenna of claim 6, wherein the linear branch of the second conductor receives frequencies in the GSM1800 band.
12. The antenna of claim 6, wherein the second conductor acts as a parasitic
20 plane reflector.
13. The antenna of claim 6, wherein the second conductor is positioned behind the space-filling or grid dimension branch of the dual branched conductor.
- 25 14. The antenna of claim 6, wherein the second conductor is smaller than the space-filling or grid dimension branch of the dual branched conductor and the second conductor is positioned behind a portion of the dual branched conductor.
15. The antenna of claim 6, wherein the second conductor has a non-
30 rectangular shape.

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16. The antenna of claim 6, wherein one or more curves of the space-filling or grid dimension branch of the dual branched conductor are replaced by a solid conductor portion.
- 5 17. The antenna of claim 6, wherein the linear branch of the first connector is electrically connected to the space-filling or grid dimension branch near a proximal end of the space-filling or grid dimension branch, said proximal end of the space-filling or grid dimension branch located near the base of the antenna substrate.
- 10 18. The antenna of claim 6, wherein the linear branch of the first connector is electrically connected to the space-filling or grid dimension branch at a distal end of the space-filling or grid dimension branch.
- 15 19. A housing for use with a mobile communication device containing the antenna of claim 6.
20. A multi-band monopole antenna for external use in a mobile communication device, comprising:
- 20 an antenna substrate with a base, a top, a front side and a back side;
a first conductor located on the front side of the antenna substrate, said first conductor comprising a dual branched antenna with a space-filling or grid dimension branch for receiving frequencies in the GSM900 band and a linear branch for receiving frequencies in the GSM1800 band; and
- 25 a second conductor located on the second side of the antenna substrate, said second conductor comprising a conducting plate that is positioned behind the space-filling or grid dimension branch of the dual branched antenna,
wherein the first conductor and the second conductor are electrically connected at the top of the antenna substrate through holes in the antenna substrate.